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Feature Article - Australia's Tradable Sector

Introduction

When analysing a small, open economy like Australia's, it is useful to make a distinction between the tradable and non-tradable sectors. This distinction is especially relevant to analyses of: the effects of changing exchange rates; the causes and effects of changes in domestic costs and prices; and trends in the volume and value of international trade.

Analysts in government, universities and business have experienced considerable difficulty obtaining data dissected along tradable and non-tradable lines, and this has acted as a constraint on their empirical research. To fill this gap, the Australian Bureau of Statistics has developed experimental output measures and price indexes for the tradable and non-tradable sectors of the Australian economy. The experimental price indexes can assist analyses of price transmission between the world economy and the Australian economy.

This article discusses the construction of experimental estimates based on the Input-Output tables published by the ABS. They are based on weighting data to 1989-90, and the price index data extend to 1994-95.

A domestically produced good or service is defined as tradable if:

- it is actually traded internationally, or
- it could be traded at some plausible variation in relative prices — this includes domestically produced goods and services which replace imports in the domestic market.

The difference between a commodity being tradable and its actually being traded therefore depends on the profitability of trade.

An industry is defined as importable if a significant proportion of its output replaces imports in the domestic market. An industry is defined as exportable if a significant proportion of its output is actually exported. (For the purpose of this study, a threshold of 10 per cent is used to determine whether an industry is exportable or importable). Based on these definitions, an industry may be defined as both importable and exportable at a given point in time. All industries which are classified as importable and/ or exportable form part of the tradable sector. The non-tradable sector consists of the remaining industries.

Main findings

The experimental estimates cover the period from the mid 1970s to the mid 1990s.

The estimates of sector sizes show the following features:

- The tradable sector accounted for about one-quarter of total Australian output.
- Importables accounted for a slightly larger share of output than did exportables, but the exportable share rose appreciably during the second half of the 1980s.
- Between the mid 1970s and the late 1980s, the contribution of agriculture to exportables fell markedly and the contribution of mining to exportables rose markedly. The contribution of manufacturing to exportables fell during the first decade of the study, but was rising appreciably by the late 1980s.
- Throughout the period of study, manufacturing dominated the importables sector.

The experimental estimates of sectoral price indexes show the following features:

- The price index for exportables is highly volatile. Price indexes for the importables and tradable sectors are also somewhat volatile. In comparison, the price index for the non-tradable sector has shown a pattern of very gradual and smooth price increase over the period examined.
- International price fluctuations in agricultural and mining commodities have a significant influence on the exportable, importable and tradable price indexes.
- In the early 1990s, all sectors (especially exportables) showed a very low rate of price change.
- Between 1977-78 and 1994-95 the relative price ratio of tradables to non-tradables has declined.

How the experimental estimates were constructed

The methodology used to compile the estimates is based largely on a classification scheme proposed in Dwyer (1990).

In principle the split between the tradable and non-tradable sector should be in terms of commodities which are the most basic units of analysis. However, in practice where the required I-O data are only available by industry and the purpose of the project is to analyse prices, productivity, investment, employment and other resource allocations, an industry based classification was deemed appropriate. All output from an industry deemed tradable was included in the tradable sector. By using highly disaggregated industry based classifications an industry is deemed tradable if it is judged to have a substantial degree of export orientation or import substitution.

Estimating the sizes of the sectors

The sizes of Australia's tradable and non-tradable sectors were estimated in four steps:

Step 1. Measure the output of each industry within the economy

This study used GDP(I) valued at producer prices (including net indirect taxes) as the measure of output. It can be derived for each of the 109 industries in the ABS Input-Output tables.

Step 2. Identify tradable output

Tradable goods are defined to include both exports and import replacements.

Step 3. Estimate the size of the tradable sector

Using the results of steps (1) and (2) the gross product of the individual industries defined as members of the tradable sector was derived. The total gross product for the tradable sector is expressed as a share of GDP to form an estimate of the relative size of the tradable sector.

Step 4. Estimate the size of the non-tradable sector

Industries failing to qualify as 'export oriented' or 'import substitutable' are by definition members of the non-tradable sector. Therefore, the non-tradable sector is estimated as the residual share of output after the tradable share is estimated.

More detail is provided in the Appendix and in Working Paper 96/2 (ABS catalogue no. 1351.0).

Sizes of the sectors

The ABS has estimated the size of the tradable and non-tradable sectors of the Australian economy over the period 1974-75 to 1989-90. A summary of the results is provided in Table 1.

TABLE 1: SECTORAL SHARES OF OUTPUT

	Share of GDP (per cent)		Tradable	Non-tradable
	Importable	Exportable		
1974-75	14.2	13.0	27.2	72.8
1977-78	14.2	11.1	25.3	74.7
1978-79	13.6	12.7	26.3	73.7
1979-80	13.4	13.3	26.7	73.3
1980-81	14.6	10.9	25.5	74.5
1981-82	14.5	9.7	24.1	75.9
1982-83	13.3	9.3	22.6	77.4
1983-84	12.2	11.2	23.4	76.6
1986-87	13.4	11.9	25.3	74.7
1989-90	13.0	12.8	25.8	74.2

In general, the tradable sector of the Australian economy accounts for about one-quarter of total output. The sectoral shares do not exhibit distinct overall trends; however, there is some evidence of cyclical patterns.

The tradable share of output fell in the early 1980s and subsequently increased to approximate its share in the late 1970s. This reflects the considerable fall in the early 1980s of the exportable share which has since shown a sustained increase and is now approaching the share of importables in GDP. The tradable share was at its lowest in 1982-83, a year of recession and drought.

The exportable sector of the Australian economy has clearly grown since 1982-83, with both the volume of exports and the share of GDP contributed by export oriented industries increasing significantly. The importable share has been fairly steady since 1982-83 contributing around 13 per cent of output. Since the early 1980s, there has been a redirection of domestic production towards export and away from import replacement. This is consistent with the trend rise in the import penetration of the domestic market over the same period.

The contribution of exports is more volatile than importables and tends to drive the size of the

tradable sector.

Industry composition of the sectors

From Table 2 it is evident that agriculture and services industries contribute only a small share of tradable output. The mining industries, especially coal, oil and gas, contribute a significant share of tradable output. However, most tradable output is produced by manufacturing industries, the most significant of which are given in the table.

TABLE 2: INDUSTRY COMPOSITION OF THE TRADABLE SECTOR

Industry Group	(PER CENT)					
	1974-75	1977-78	1980-81	1983-84	1986-87	1989-90
Agriculture, forestry & fishing	11.2	7.7	8.9	9.7	9.3	7.3
Mining	14.7	16.5	19.4	21.4	20.3	18.3
Coal, oil & gas	6.4	8.9	12.0	14.7	13.4	11.0
Other mining	8.3	7.6	7.4	6.7	6.9	7.3
Manufacturing	60.5	63.0	58.5	54.8	55.8	61.4
Petroleum & coal products	3.9	4.2	3.3	5.6	8.3	7.1
Metal products	10.4	10.2	10.9	5.3	7.8	11.1
Motor vehicles	6.2	6.6	5.4	5.8	5.0	7.0
Machinery & equipment	10.7	9.7	8.7	7.2	6.7	7.0
Other Manufacturing	29.3	32.3	30.2	30.9	28.0	29.2
Services	13.6	12.8	13.2	14.1	14.6	13.0
Transport	8.7	9.6	10.3	11.6	10.9	10.7
Other services	4.9	3.2	2.9	2.5	3.7	2.3
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0

Table 3 shows the industry composition of the non-tradable sector. It is dominated by services industries. Agriculture and mining industries are of little importance, while manufacturing industries contribute a small and declining share of non-tradable sector output. The importance of services industries to the non-tradable sector has increased over the period considered, partly due to the increased output of the business services industry. Both the tradable and non-tradable sectors exhibit significant changes in their composition over the period examined.

TABLE 3: INDUSTRY COMPOSITION OF THE NON-TRADABLE SECTOR

Industry Group	(PER CENT)					
	1974-75	1977-78	1980-81	1983-84	1986-87	1989-90
Agriculture & Mining	4.6	3.6	4.4	4.0	2.3	3.3
Manufacturing	8.8	8.4	7.7	7.7	6.5	5.5
Services	86.6	88.0	87.9	88.3	91.2	91.2
Wholesale & retail trade	19.2	18.9	18.1	15.8	17.3	17.1
Business services	12.1	13.3	14.6	14.6	14.2	17.2

Health, education & welfare	12.4	15.1	14.5	16.2	16.6	15.2
Construction	10.9	9.7	9.0	9.6	9.9	9.6
Other services	32.0	31.0	31.7	32.1	33.2	32.1
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0

Constructing the price indexes

The price indexes for Australia's tradable and non-tradable sectors were constructed in four steps:

Step 1. Assemble the available price indexes

Price data are commonly available only on a producer price basis, and these have been used. Where such data were not available (e.g., for many service industries) other indexes — such as component series from the Consumer Price Index, implicit price deflators for the national accounts aggregate Private Final Consumption Expenditure and Australian Bureau of Agricultural Resource Economics (ABARE) indexes of prices received and paid by farmers — have been used.

Step 2. Match the available price indexes to industries

Next it was necessary to find the closest match of the available price indexes to the 109 industries used in ABS Input-Output tables. Ideally, a single and separate index would be found for each industry but in practice that was not possible. For the many industries, a weighted average of several available indexes was used; for others, one price index was used for several Input-Output industries.

Step 3. Construct weights for each industry

The weights applied to industry price indexes were based on the share of tradable or non-tradable sector output contributed by each industry. As the output data were available only for years in which Input-Output tables were constructed (see Table 1), it was necessary to interpolate and extrapolate the weighting data to cover the full span of years covered by the experimental estimates (i.e., from the mid-1970s to the mid-1990s).

Step 4. Construct price indexes for the tradable and non-tradable sectors

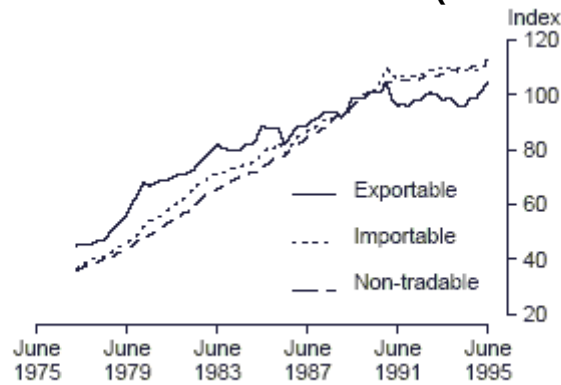
The sectoral price indexes were then constructed from the industry weights and industry price indexes using a chained Tornqvist index formula. The reasons for choosing the Tornqvist formula, and comparisons of its performance with alternative formulae, are presented in Working Paper 96/1 (ABS Catalogue No. 1351.0).

More details about the data and methods used are provided in the Appendix and in Working Paper 96/2 (ABS Catalogue No. 1351.0).

Tradable and non-tradable price indexes

Graph 1 shows the price indexes for the outputs of the importable, exportable and non-tradable sectors. It can be seen that the price index for the exportable sector is substantially more volatile than the importable and non-tradable price indexes. The non-tradable price index appears very stable over time. While exportable and importable prices undergo several periods of price falls, non-tradable prices increase in a fairly monotonic fashion.

GRAPH 1: SECTORAL PRICE INDEXES (1989-90 = 100.0)



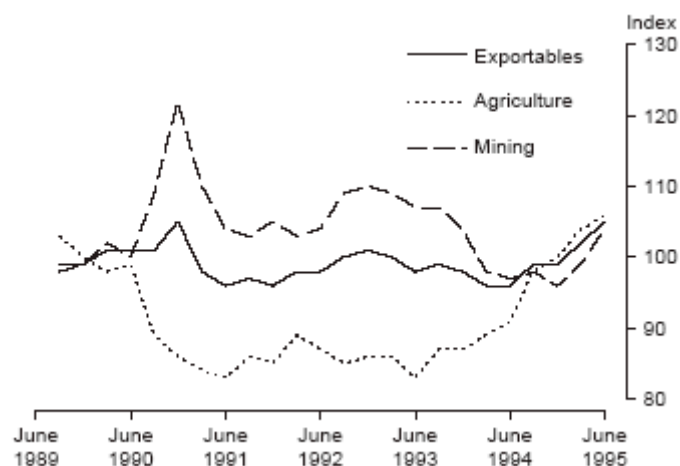
Between March 1977 and June 1995 non-tradable prices rose by more than exportable prices. The exportable price index fell substantially in the early 1990s but exportable prices rose strongly in 1994-95. The importable and non-tradable price indexes have shown fairly small rises over the early part of this decade.

A number of episodes can shed light on the fluctuations in the exportable and importable price indexes:

- For exportables, a sharp price rise in the late 1970s and subsequent fall in 1980 is visible. This can be explained by the resources boom which involved a sharp price rise for several metals. The price index for the non-ferrous metal ores industry exhibits a sharp price rise and subsequent fall at this time.
- Both importables and exportables show significant price falls in 1986. This was a result of the international oil price collapse. The price indexes for the coal, oil and gas and petroleum and coal products n.e.c. industries show a dramatic price fall; while the first of these industries is classified as both importable and exportable, the second is classified as importable only.
- The fall in the exportables price index in late 1988, following strong price growth, can in part be attributed to the collapse of the wool reserve price scheme. The price index for the sheep farming industry falls dramatically from its peak in the June quarter 1988.
- Both the importable and exportable price indexes rose significantly in the December quarter 1990 and then decreased substantially in the March quarter 1991. The effect is particularly strong for exportables. This can be explained by the impact of the Gulf War on the price indexes for the coal, oil and gas and the petroleum and coal products n.e.c. industries.

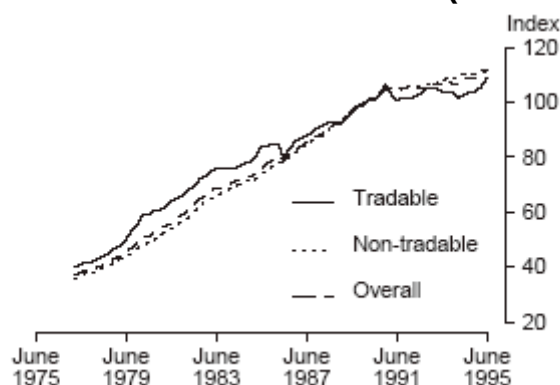
From Graph 1 the exportable sector has been the most volatile of the three sectors. The reason for this is that the mining and agriculture industries make up about half of the output of the exportable sector. From September 1989 the index for exportables, as seen in Graph 2, is heavily influenced by these two industries. The volatility in these industries is due to their responsiveness to domestic and international shocks. The mining sector was influenced by the Gulf War in 1990-91 and as it comprises up to 35 per cent of exportable output it pulled the exportable price index down in March 1991.

GRAPH 2: INFLUENCES TO THE EXPORTABLE SECTOR



Graph 3 shows the price indexes for the tradable and non-tradable sectors. The tradables price index reflects price movements in both the importable and exportable sectors, while the overall price index reflects price movements in all sectors. As expected, the overall price index is fairly smooth over time. The tradables price index is somewhat volatile and reflects the episodes outlined above in respect of the importable and exportable price indexes. Since 1990, the price of tradables has risen by less than the price for non-tradables, although tradable prices rose significantly during 1994-95.

GRAPH 3: SECTORAL PRICE INDEXES (1989-90 = 100.0)



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